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Dear Mr. President

Three experts suggest science and technology policies for the new president.

By Ernest J. Moniz, John D. Halamka, and Charles M. Vest

Energy

Managing Power

We need a portfolio of proven low-carbon energy technologies, says Ernest Moniz.

Dear Mr. President:

The country faces energy challenges that we cannot put off to a next administration or a next generation. We are running out of time to develop and deploy technologies that can mitigate climate risk and enhance national security.

The urgency stems from the collision of two realities. On the one hand, energy is a highly capitalized, multitrillion-dollar commodity business with highly developed supply chains, and it provides essential services and requires extensive regulation. Substantially changing the energy mix takes decades.

On the other hand, any prudent evaluation of climate-change risks suggests that concentrations of atmospheric greenhouse gases must be stabilized within a few decades. We must begin moving toward a low-carbon energy future now. Furthermore, only a global commitment will do. American leadership is essential if we are eventually to bring China and other emerging economies into a worldwide effort to mitigate these risks.

Reducing our dependence on hydrocarbon fuels will also promote energy security, providing more latitude in foreign policy.

In this context, I respectfully suggest the following actions for the first year of your administration:

(1) Implement carbon dioxide emissions pricing, most likely through a cap-and-trade system. Charging for carbon emissions will stimulate the market to introduce

low-carbon technologies. The cap-and-trade system should move as quickly as possible toward an auction system, with the funds returned to the public in a progressive manner.

(2) Work with the private sector to provide a portfolio of proven, cost-effective low-carbon energy technologies. Goals should include new nuclear power plant construction, a strong renewables program, and a program to demonstrate large-scale carbon dioxide sequestration. Realistically, this will require a small charge on energy supply. The scale of the program needs to be in the range of \$10 billion a year for 10 to 15 years.

(3) Establish a mechanism for coordinating the many interests that must influence a coherent energy policy: national security, foreign policy, environmental policy, agricultural policy, fiscal policy, and so on. The administration's policy position must also reflect the legitimate and often diverging energy interests of different regions of the country. The Department of Energy does not have the capacity to bring together these disparate interests without help from the White House. One option is to appoint an assistant to the president for energy, who would work with the energy secretary.

(4) Commit to implementing, within 10 years, a 21st-century electricity grid that will enable development of large-scale regional resources for renewable electricity. Introducing energy efficiency standards for new buildings and financial incentives for retrofitting existing buildings should be a high priority.

Ernest J. Moniz is Director of The MIT Energy Initiative.

Medicine

Digitizing Health Care

We need new incentives For electronic record keeping, says John Halamka.

Dear Mr. President:

As you know, the United States is spending 16 percent of our gross domestic product on health care, a percentage that is likely to rise. That might be reasonable if we were getting correspondingly high quality, but we're not. While we have some of the best individual-care facilities in the world, our system does not rank well against other industrialized nations on basic health measures.

Health-care information technology is one of the major tools the United States can use to constrain cost increases and enhance quality. To date, the U.S. has adopted

electronic health records (EHRs) at a much lower rate than most other industrialized nations, including Germany, Canada, the United Kingdom, and Australia. The U.S. spends 43 cents per capita on health-care IT, compared with \$193 per capita in the U.K.

Incentives to introduce EHRs and a compelling business case for continuing to use them are crucial to getting the technology adopted on a wide scale. In the outpatient setting, implementing a system of EHRs that providers can easily share costs those providers \$40,000 to \$60,000. Yet most of the benefits go to payers and purchasers--often the U.S. government. To fix the misalignment, the government should offer incentives directly to providers.

We need to be careful, though, about what actions the government takes. A recent Congressional Budget Office report concluded that imposing penalties for failing to adopt health IT would be more cost effective than providing financial incentives. Primary-care physicians in the U.S. are already struggling with high costs and low reimbursement. Asking them to comply with another unfunded mandate based on penalties rather than incentives won't solve the problem, because it doesn't acknowledge the underlying economic misalignment that has discouraged adoption in the first place. The result won't be more EHRs; it will be fewer medical students choosing primary-care careers, which will fuel even greater increases in health-care costs.

I recommend a three-point plan for your administration:

- (1) Provide incentives through Medicare for the adoption and use of EHRs. Target these incentives so that cost savings are shared with clinicians.
- (2) Encourage insurers to provide incentives for hospitals to adopt CPOE (computerized physician order entry). This technology, which lets physicians communicate treatment instructions electronically, is the most important tool hospitals can introduce to improve their safety, quality, and efficiency of care.
- (3) Continue to provide federal funding for technology and policies that encourage interoperability between health-care providers.

If we coordinate the care of all Americans and ensure that every person has a lifetime electronic record, we will enjoy safer care at a reasonable price.

John D. Halamka is chief information officer at Harvard Medical School.

Research**Reasserting Competitiveness**

Invest in education, research, and innovation, says Charles Vest.

Dear Mr. President:

Your ability to govern effectively and provide world leadership will depend profoundly on advancing and utilizing the knowledge and tools of science, engineering, and medicine.

In the 20th century, U.S. achievement in these fields protected our nation's security, fueled most of our economic growth, and nearly doubled our life span. It sent us to the moon, fed the planet, brought world events into our living rooms, established instant worldwide communications, gave rise to ubiquitous new forms of art and entertainment, uncovered the workings of our natural world, and gave us freedom of travel by air, sea, and land. It was a century of speed, power, and new horizons. We have come to take all this for granted.

The 21st century will be very different. And nothing can be taken for granted. To grasp the great opportunities of our times and to meet our challenges in a number of areas--from economic competitiveness to energy, from health care to education, from security to infrastructure--federal policy and action must be informed and enabled by a vibrant science and technology enterprise.

Indeed, our national comparative advantage is a strong science and technology base - coupled with a free-market economy and a democratic society.

We will soon feel the full force of global competition. Jobs will follow innovation wherever it is found, and innovation will follow basic research. Our children must be inspired and educated for productive, well-paying jobs in this knowledge economy.

The bipartisan America Competes Act was passed and signed into law in August 2007 but has not been funded. It would jump-start improvement in K-12 science and math education, strengthen and sustain long-term basic research, make the U.S. the best place in the world to study and do research, and help ensure that we remain the most innovative nation on the planet. Its cost is about 0.14 percent of the Wall Street bailout or 1.8 percent of the annual farm subsidy.

Mr. President, the federal government must invest in our future through education, research, and innovation. I therefore believe you should take six immediate actions:

- (1) Use your bully pulpit to establish a public vision of an America that will lead and prosper in the 21st century through knowledge and innovation.
- (2) Appoint a science and technology advisor before your inauguration and include him or her at the highest tables of counsel and decision making, just like the national security advisor.
- (3) Make full funding of the America Competes Act a nonnegotiable first-term priority.
- (4) Establish a bold national initiative engaging the private sector, academia, and government to meet our energy challenge and mitigate the advance of global climate disruption.
- (5) Restore strong basic-research budgets to the Department of Defense and increase the National Institutes of Health's budget in excess of inflation.
- (6) Work with Congress to eliminate academic earmarking.

My colleagues in industry, academia, and government stand ready to support your new administration with fact-based advice and to provide the knowledge and innovation required for U.S. prosperity and improved life around the world.

Charles M. Vest is President Emeritus of MIT and President of The National Academy of Engineering.

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Upcoming Events

[2008 Medical Innovation Summit \(http://www.clevelandclinic.org/innovations/summit\)](http://www.clevelandclinic.org/innovations/summit)

Cleveland, Ohio

Monday, November 10, 2008 - Wednesday, November 12, 2008

<http://www.clevelandclinic.org/innovations/summit> (<http://www.clevelandclinic.org/innovations/summit>)

[MITX Awards \(http://www.mitxawards.org/\)](http://www.mitxawards.org/)

Boston, Massachusetts

Wednesday, November 19, 2008

<http://www.mitxawards.org/> (<http://www.mitxawards.org/>)

[Academic Enterprise Awards Europe \(http://www.sciencebusiness.net/aces/\)](http://www.sciencebusiness.net/aces/)

Stockholm, Sweden

Tuesday, December 02, 2008

<http://www.sciencebusiness.net/aces/> (<http://www.sciencebusiness.net/aces/>)

[WHIT 4.0 \(http://www.whitcongress.com\)](http://www.whitcongress.com)

Washington, DC

Monday, December 08, 2008 - Wednesday, December 10, 2008

<http://www.whitcongress.com> (<http://www.whitcongress.com>)